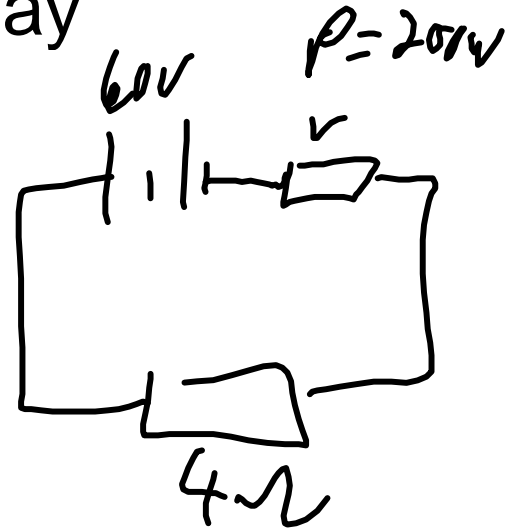
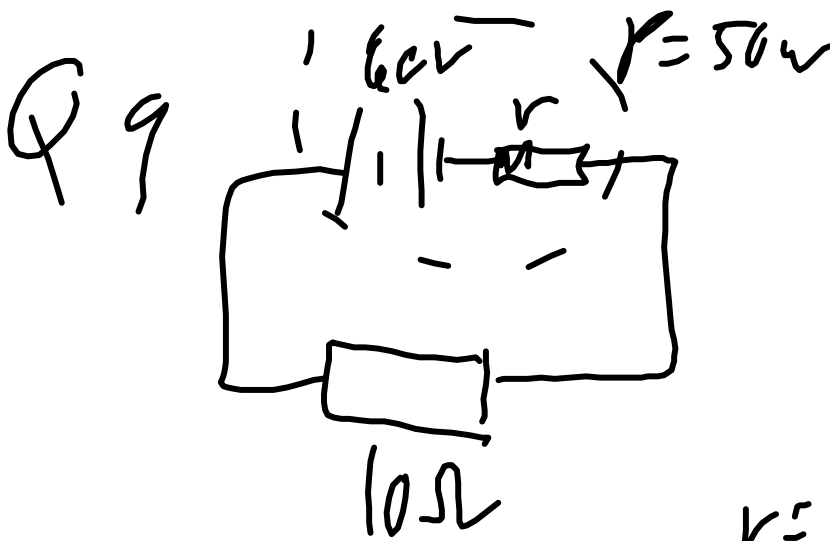


Circuits recap - test Thursday



$r = ?$

$$P_1 = I_1^2 r \quad P_2 = I_2^2 r$$

$$\frac{P_2}{P_1} = 4 = \frac{I_2^2}{I_1^2} \quad 2 = \frac{I_2}{I_1}$$

$I_2 = 2I_1$

~~$\Sigma = I(R + r)$~~

$$60V = I_1(10 + r) = I_2(4 + r)$$

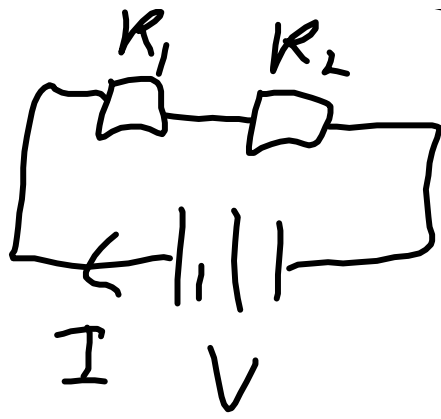
$$\cancel{I_1}(10 + r) = 2\cancel{I_1}(4 + r)$$

$$10 + r = 8 + 2r$$

$$r = 2\Omega$$

Series R_1 R_2

Series



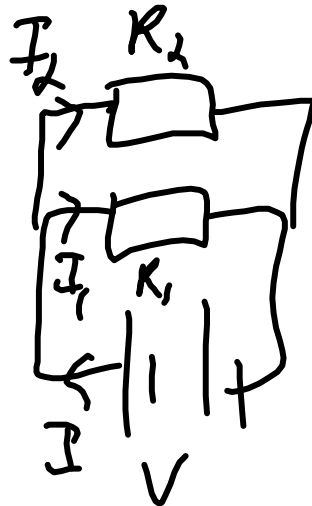
I same

$$I_{\text{out}} = I_1 = I_2 = I_{\text{in}}$$

$$V = V_1 + V_2$$

$$I R_T = I_1 R_1 + I_2 R_2$$

$$R_T = R_1 + R_2$$



$$I = I_1 + I_2$$

$$V = V_1 = V_2$$

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2}$$

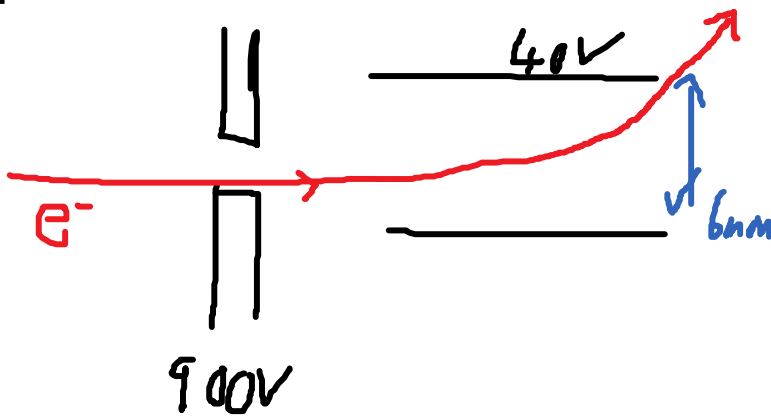
Test review:

correct the quiz, practice test

eg. CRT

an electron is accelerated through

900V, then it goes between 2 parallel plates, with 40.0V 6.00 mm apart.



a) what is the speed of the electron after being accelerated through 900V?

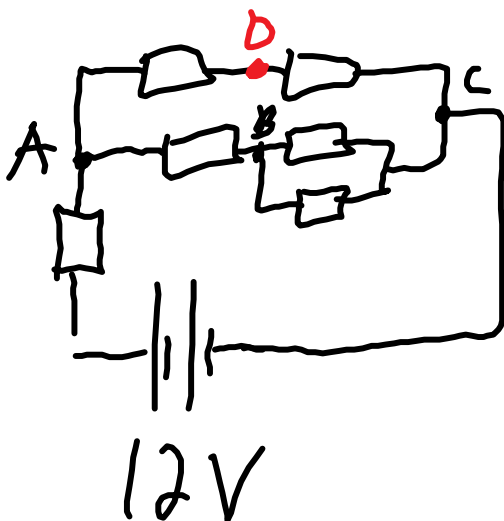
recall $V = \text{energy}/q$

b) what is the electric field strength, E , between the parallel plates?

$$E = V/d$$

c) what is the force and acceleration on the electron? $m = 9.11 \times 10^{-31} \text{ kg}$
 $F = Eq = ma$

2.



if all the resistors are 2.0Ω
 determine V_{BC}

if D is cut, how does V_{BC} change? up/down/same?

a) what is the speed of the electron after being accelerated through 900V?

recall $V = \text{energy}/q$ $\frac{1}{2}mv^2 = Vq$

$$v = \sqrt{2 \times 900 \times 1.602 \times 10^{-19} / 9.11 \times 10^{-31}} = 1.77913260973701 \times 10^7 \text{ m/s}$$

b) what is the electric field strength, E, between the parallel plates?

$$E = V/d$$

$$= 40/0.006 = 6,666.6667 \text{ N/C}$$

c) what is the force and acceleration on the electron? $m = 9.11 \times 10^{-31} \text{ kg}$

$$F = Eq = ma$$

$$F = Eq = 6.66666667 \times 1.602 = 10.68000001 = 1.1 \times 10^{-15} \text{ N}$$

$$a = F/m = 1.068 / 9.11 = 0.1172$$

$$a = 1.2 \times 10^{15} \text{ m/s}^2$$

Millikan oil drop experiment -

levitated charged oil drops using electric fields - produced by 2 parallel plates with voltage - discovered the charge of the electron.

$$F_g = F_e$$

$$mg = Eq = Vq/d$$

$$q = mgd/V$$